I claim:

1. A method of transmitting packets over a network, comprising the steps of:

(1) transmitting a plurality of test packets over the network during a plurality of different time slots;

(2) on the basis of step (1), evaluating which of the plurality of different time slots corresponds to favorable network traffic conditions; and

(3) transmitting data packets over the network using one or more favorable time slots evaluated in step (2).

2. The method of claim 1, wherein step (1) comprises the step of transmitting the plurality of test packets using a lower priority level than is used to transmit data packets in step (3).

3. The method of claim 1, wherein step (2) comprises the step of evaluating packet latencies associated with the test packets.

4. The method of claim 1, wherein step (2) comprises the step of evaluating dropped packet rates associated with the test packets.

5. The method of claim 1, wherein step (1) comprises the step of transmitting the test packets at a data rate corresponding to an expected connection bandwidth.

6. The method of claim 1, wherein step (2) comprises the step of a transmitting node performing an evaluation of latencies and dropped packet rates associated with the plurality of different time slots.

7. The method of claim 1, wherein step (2) comprises the step of a receiving node performing an evaluation of latencies and dropped packet rates associated with the plurality of different time slots.

8. The method of claim 1, wherein the test packets and the data packets comprise Internet Protocol (IP) packets transmitted over a packet-switched network.

9. The method of claim 8, wherein the IP packets are scheduled for transmission within time slots within a frame that is synchronized to a clock.

10. The method of claim 1, wherein the test packets are transmitted at a priority level that is lower than the data packets in step (3), but higher than other data packets containing other data transmitted on the network.

11. The method of claim 1, wherein the data packets comprise voice data.

12. The method of claim 1, further comprising the step of repeating steps (1) through (3) for each side of a two-way connection between two nodes in the network.

13. The method of claim 1, wherein the network is a packet-switched network comprising packet switches that maintain packet queues.

14. The method of claim 13, wherein each packet switch comprises at least two packet queues, a higher-priority queue for transmitting the data packets of step (3) and a lower-priority queue for transmitting the test packets of step (1).

15. In an Internet Protocol (IP) network comprising a plurality of packet switches, a method of transmitting data packets, comprising the steps of:

(1) establishing a time reference frame comprising a plurality of time slots during which IP packets are to be transmitted across the IP network;

(2) from a transmitting node, empirically determining which of the plurality of time slots is associated with a reduced rate of packet congestion with respect to an intended recipient node; and

(3) transmitting a plurality of data packets from the transmitting node to the intended recipient node during one or more time slots empirically determined to be associated with the reduced rate of packet congestion in step (2).

16. The method of claim 15, wherein step (2) comprises the step of transmitting a plurality of test packets during a plurality of different time slots from the transmitting node to the intended recipient node.

17. The method of claim 16, wherein step (2) comprises the step of transmitting the test packets using a packet priority level lower than a packet priority level used to transmit the plurality of data packets in step (3).

18. The method of claim 17, wherein step (2) comprises the step of transmitting test packets at a data rate sufficient to support a desired bandwidth in step (3).

19. A computer having a network interface and programmed with computer-executable instructions that, when executed, perform the steps of:

(1) transmitting a plurality of test packets at a first priority level over a network to which the computer is connected during a plurality of different time slots;

(2) on the basis of step (1), evaluating which of the plurality of different time slots corresponds to favorable network traffic conditions; and

(3) transmitting data packets over the network at a second priority level using one or more favorable time slots evaluated in step (2), wherein the second priority level is higher than the first priority level.

20. The computer of claim 19, wherein the computer-executable instructions further perform the step of evaluating packet latencies with a second computer connected to the network.